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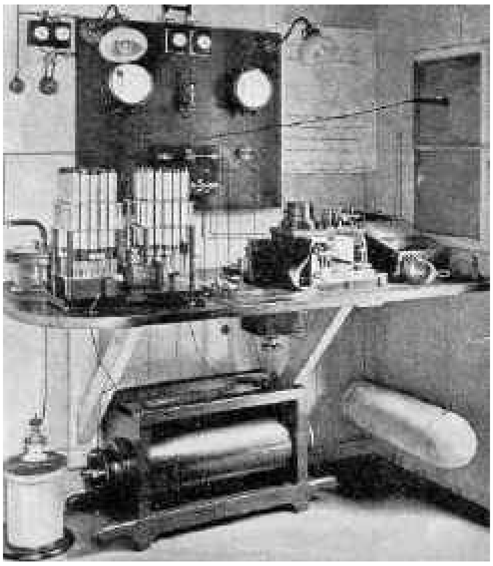
To the question of the first radiogram in the world



Five days after May 7, 1895, when at a meeting of the Physical Department of the Russian Physicochemical Society (RFHO) A.S. Popov for the first time publicly demonstrated the alarm system he invented for a distance without wires, the Kronstadt Bulletin newspaper reported this fact, noting that the signals were transmitted by a Hertzian vibrator of 30 fathoms (64 m) and that “the reason for all these experiments is the theoretical possibility of signaling to a distance without conductors, like an optical telegraph, but using electric beams” (here and further highlighted by us. - E.K., I.M.) [1, p. 51]. Therefore, A.S.Popov began his experiments not without reason. And this reason was the ultimate goal - a wireless “telegraph-like alarm”. It should be noted that all the demonstrations and public speeches of A.S.

So, it was documented that on May 7, 1895 A.S. Popov transmitted and received artificial signals. What were these signals? We find the answer in an article by A.S. Popov himself, published in the January issue of the Journal of RFHO for 1896, where he writes that during the experiments, the receiver’s call answered with short or continuous sounding signals of the transmitting device for an appropriate duration [1, from. 65]. This means that the system demonstrated on May 7, 1895 had the fundamental possibility of transmitting and receiving code signals (for example, Morse code) without wires at a distance of 30 fathoms indicated in the sources.

None of the listed sources reports which particular combinations of short and long signals (in other words, dots and dashes of the Morse code) were transmitted during the demonstration. But even without that, the priority of A.S.Popov in the matter of inventing a wireless telegraph is obvious. For comparison, we point out that only some authors who describe Marconi's early experiments in his father's estate near Bologna say, but are not documented, that he transmitted only the letter “C” with three points of the Morse code. It should be noted that the signals in the first receivers of both Popov and Marconi were indicated by ear: at Popov - with an electric bell, at Marconi - with a special electromagnetic drummer.

As V.M. Rodionov rightly notes, Popova was satisfied with sound signaling with the help of an electric bell, which was quite suitable for the navy. “Marconi tried to adapt his equipment to the needs of the postal and telegraph department and soon came to the necessity of using standard telegraph devices with recording signals on tape. Popov used signal recording on paper tape in his lightning detector in 1895. In the receiver for signaling, he used tape recording a little later, although in his first experiments he was convinced that any devices can be operated with the help of a relay - from a telegraph apparatus to an electric fuse "[2, p. 86].

In the light of the above reasoning, let us consider a demonstration by A.S. Popov on March 12 (24), 1896 in the same society as a year ago. Was there a need for a simple repetition of the experience already shown to the audience? The answer is likely to be negative. Obviously, it was a different demonstration. The radio communication distance increased significantly - up to 250 m. Popova's assistant P.N. Rybkin was in another building and had to transmit some kind of signal or a group of signals consisting of short and long transmissions via a pre-agreed code understandable to the receiving side.

It seems that the past year has enriched the experimenters with new experience, showed more real capabilities of the equipment to overcome the distance, which has acquired military significance, especially for a scientist working in the Navy. Perhaps A.S.Popov, knowing that the minutes of the RFHO meetings are regularly printed in the journal of the company and distributed throughout the country and abroad, did not allow a detailed record, and A.L. Gershun, who conducted business-
production in that year RFHO, wrote down briefly from his words: A.S. Popov shows instruments for lecture demonstration of Hertz's experiments. Their description has already been placed in the "Journal of RFHO."

There were restrictions on the part of the command to publish the results of work that are relevant to the navy. This, in particular, is evidenced by the report of the Chief of the Mine Officer Class V.F. Vasiliev, in which, asking permission from A.S. Popov to make another report to civilian experts, he adds that the report on the wireless telegraph will not be raised in the report. The impulse to classify radio communications later could come from foreign reports about the experiments of Marconi, surrounded by a halo of mystery, with equipment hidden in black boxes. In the act of the RFHO commission, created in 1908 specifically to clarify the role of A.S. Popov in the invention of the wireless telegraph, it is written: “the device built in the winter of 1896 was shown on March 12, 1896 <...> The use of the device to transmit signals over a distance was kept secret so far ”[1, p. 251].

In a letter to E. Ducreta, A. Popov reported on the device equipment used in the spring of 1896: “... in March I demonstrated a device for optical experiments with electromagnetic rays - reflection, refraction, the action of a grating and rotation of a plane polarization by a layered tree ”[3, p. 49]. The figure attached to this letter depicted the indicated receiver with a small antenna placed in the focus of a parabolic reflector (400 mm high).

In a report at the First All-Russian Electrotechnical Congress (December 1899), A.S. Popov recalled that in his article, marked on December 1895, it was said: “In conclusion, I can express hope that my device can be used with further improvement to transmitting signals over a distance ... "And then he continued:" The realization of this hope was not long in coming. During 1896, I studied with the device I invented and in the spring demonstrated it again at a meeting of the Russian Physicochemical Society in an appendix to the reproduction of Hertz’s experiments with electric rays ”[1, p. 216].

As can be seen from these lines, A.S.Popov himself does not say anything about the transmission of words in Morse code, but says that the realization of the hope expressed in 1895 for the use of his device for radio communications began already in 1896. Apparently, the attention of the scientist At that time, he was confined to fundamental radio communication issues, including such aspects as transmitter power, radiation directivity, receiver sensitivity, and he did not note the particular effect achieved, such as the transmission of meaningful words.

Allegations that during this demonstration a two-word radiogram “Heinrich Hertz” was transmitted appeared for the first time in connection with the article of one of the veterans of Russian radio engineering V. S. Gabel, which he sent to the English magazine “Wireless World” on the occasion of its 30th anniversary wireless telegraph, devoting it to the description of the historical report by A.S. Popov on May 7, 1895. The editor of this magazine asked V.S. Gabel to send detailed information regarding the demonstration by A.S.Popov of transmitting a verbal radiogram at a meeting of the RFHO on March 12 (24), 1896 Necessary information They were received from the direct participants in the meeting, O.D. Khvolson, V.K. Lebedinsky, and V.V. Skobeltsyn. The memories of these scientists deserve to be repeated again [4, p. 212].

Professor O.D. Hvolson: “... You are interested in the details of that meeting of the Physical Society, in which A.S. Popov for the first time demonstrated a wireless transmission. I attended this meeting and clearly remember all the details. The departure station was at the University’s Chemical Institute, and the reception station was in the auditorium of the old physics room. The distance is approximately 250 meters ... The letters were transmitted in the Morse alphabet, and moreover, the signs were clearly audible. The board was prof. F.F. Petrushevsky, holding a paper with a key to the Morse alphabet and a piece of chalk ... Gradually, the words “Heinrich Hertz”, moreover in Latin letters, turned out on the blackboard. It is difficult to describe the enthusiasm of the many present and the standing ovation to Popov when these two words were written. The meeting took place at the beginning of 1896, but I cannot establish the exact date. ”

In the memoirs of O.D. Hvolson, attention is drawn to such a detail as paper with a translation of the Morse code into the Latin alphabet. such paper should be prepared in advance for the receiving (probably also transmitting) radiogram if they do not know the Morse code by heart. Apparently, O.D. Hvolson spoke about the same demonstration at a meeting of the RFHO dedicated to the memory of Popov 20 years before V.S. Gabel addressed him. The published protocol of the emergency 239 (289) th meeting of the Physical Department of January 24, 1906 reads as follows: “O. D. Hvolson reminded those present about the historic meeting of the Physical Department, in which A. S. Popov for the first time showed a telegraph without wires. The departure station was arranged in the chemical laboratory of St. Petersburg University, the reception station in the meeting room in the old physics room. Signs were transmitted in the Morse alphabet, the key of which was in the possession of Chairman F.F. Petrushevsky. After each sign received, the chairman marked the corresponding letter on the board. It is difficult to describe the enthusiasm of those present when the words “Heinrich Hertz” appeared on the board ”[4, p. 96].

O.D. Hvolson does not mention the telegraph apparatus, but speaks only about the use of the Morse alphabet, so there is no doubt about the authenticity of his memories.

Two other participants in the same meeting recall other details compared to O.D. Hvolson.

Professor V.V. Skobeltsyn: “... The so-called A.Popov lightning detector, in which the Richard’s drum and writing pen was replaced by the Morse apparatus, served as the receiver ... Instead of a lightning rod, the lightning detector was connected to a bare copper wire (1.5 –2 m), released through the window frame to the outside and suspended from the roof of the building, from which it was isolated by a chain of two or three porcelain rings. This wire after the meeting for a long time (several weeks, maybe months) continued to hang outside the audience window. And I remember it well, therefore ... Signals were recorded in the audience of the meeting with an ordinary Morse apparatus on tape, and the operation of the apparatus was audible to the entire audience. At the end of the broadcast, the tape was transmitted to the audience ... When the minutes of the meeting appeared in the journal, I was struck by the entry in it ... Secretary of the meeting A.L. Gershun said

Professor V.K. Lebedinsky: “... in March 1896, A.S. Popov demonstrated a wireless telegraph transmission ... the words“ Heinrich Hertz ”were transmitted. I kept the tape on which this program was recorded, but now I don’t have it, since almost all of my library died in Riga in 1918-1919, where I was a professor at the Polytechnic ... The avarice in the words of the protocol is very small depicting the essence and high importance of the report, due to the fact that in 1896 the work of A. S. Popov was carried out under the control of the Ministry of the Sea and could not be disclosed. ”

Let us now turn to an article written in 1906 by E.L. Korinfsky, one of the closest comrades and employees of A.S. Popov. It says: “... to borrow the received signals, an ordinary Morse telegraph apparatus was attached parallel to the electric bell, and thus the question of the practical possibility of sending and receiving signals using electromagnetic waves was finally resolved by the spring of 1896” [4, p. . 92].

One must think that E.L.Korinfsky knew a photograph in which the first receiver of A.S.Popov (1895) was captured, in conjunction with the Morse telegraph apparatus. Such a photograph was transferred by A. S. Popov in the summer of 1901 to the president of the Philadelphia company of the American Society of Wireless Telegraphs and Telephones and reproduced by the Philadelphia newspaper “The North American” on September 11, 1901. The photograph of the newspaper strip and the original photograph were published by IV Brenev [5 , from. 125 and 126].

The transfer of a radiogram with the text “Henry Hertz” by A. S. Popov was also confirmed by P. Popov’s assistant P. N. Rybkin, who was at the transmitter during the demonstration [6]. In 1945, Academician V.F. Mitkevich made the same recollections, who named the other participants in the meeting by name [4, p. 259], in 1951 - M.A. Chatelin [4, p. 317].

The question of transmitting the first radiogram in the world with the words “Heinrich Hertz” on March 12, 1896 was brought up for discussion by the American historian C. Zuskind in 1962, and in recent years this question has been discussed by Moscow professor N. I. Chistyakov. Denying the fact of transmitting this radiogram, both authors go even further, denying Popov’s invention of a radio communication system. But, as already noted, the priority of A.S.Popov is not associated with this radiogram. He was proved by all his practical activities and more than ten publications in print long before G. Marconi or any other contender for this invention appeared on the horizon. The arguments of Ch. Zyuskind and N.I. Chistyakov are based on the fact that the press did not report the transmission of these words, and when A.S.Popov held a similar demonstration at the end of 1897, two newspapers noted this fact. N.I.

Recall, however, that when in the summer of 1895 A.S.Popov made a device for recording atmospheric discharges on the basis of his receiver, then in this device he connected a recording device of the Richard brothers in parallel with the bell. Popov's scheme allowed the connection of additional devices, as between the coherer and the bell was an intermediate “telegraph” relay. A Morse receiving telegraph apparatus could also be connected as an additional device. By the way, the receiver, demonstrated by A.S. Popov on March 12 (24), 1896, is now in the A.S. Popov Memorial Museum at the State Electrotechnical University. A few years ago, students of LETI restored a system with a Morse telegraph apparatus and sought its coordinated work. This “investigative experiment” speaks in favor of

Our opponents often refer to the publication of the report of A.S.Popov at the Electrotechnical Institute on October 19, 1987, at the end of which the following words are given: “Here is a telegraph device. We were unable to send a connected telegram, because we had no practice, all the details of the devices still need to be developed ”[1, p. 128]. However, in our opinion, the above words do not refer to all the activities of A.S.Popov during this period, but only to the circumstances of this report, which was prepared in a hurry, as Popov himself said before the speech: “I am standing in front of you in my midst work and busy time, so everything that I brought here was collected hastily and is more likely to matter schematic experience ... ”[ibid, p. 116]. Note that back in March 1897 in the program of the lecture by A.S. Popov's “On the possibility of telegraphing without conductors” noted the following points of the lecture: “... the possibility of telegraphing with electromagnetic rays to a distance using an ordinary Morse telegraph apparatus”, and he attributed it with his hand: “Experiments in this direction, carried out in Kronstadt and in the Mine detachment in Transund. Marconi works in the same direction. The lecture will be accompanied by experiments ”[1, p. 82]. In a report on this lecture, the Kotlin newspaper reported on April 1, 1897: "The experiments that furnished the lecture were successful and aroused great interest in the audience." It is not difficult to conclude from this that by March 1897 A.S. Popov had already gained experience in using the Morse telegraph apparatus to record received signals so much that he could already share it with the audience of his lecture. the possibility of telegraphing using electromagnetic rays to a distance with an ordinary Morse telegraph apparatus, ”and he attributed with his hand:“ Experiments in this direction made in Kronstadt and in the Mine detachment in Transund. Marconi works in the same direction. The lecture will be accompanied by experiments ”[1, p. 82]. In a report on this lecture, the Kotlin newspaper reported on April 1, 1897: "The experiments that furnished the lecture were successful and aroused great interest in the audience." It is not difficult to conclude from this that by March 1897 A.S. Popov had already gained experience in using the Morse telegraph apparatus to record received signals so much that he could already share it with the audience of his lecture. the possibility of telegraphing using electromagnetic rays to a distance with an ordinary Morse telegraph apparatus, ”and he attributed with his hand:“ Experiments in this direction made in Kronstadt and in the Mine detachment in Transund. Marconi works in the same direction. The lecture will be accompanied by experiments ”[1, p. 82]. In a report on this lecture, the Kotlin newspaper reported on April 1, 1897: "The experiments that furnished the lecture were successful and aroused great interest in the audience." It is not difficult to conclude from this that by March 1897 A.S. Popov had already gained experience in using the Morse telegraph apparatus to record received signals so much that he could already share it with the audience of his lecture. Marconi works in the same direction. The lecture will be accompanied by experiments ”[1, p. 82]. In a report on this lecture, the Kotlin newspaper reported on April 1, 1897: "The experiments that furnished the lecture were successful and aroused great interest in the audience." It is not difficult to conclude from this that by March 1897 A.S. Popov had already gained experience in using the Morse telegraph apparatus to record received signals so much that he could already share it with the audience of his lecture. Marconi works in the same direction. The lecture will be accompanied by experiments ”[1, p. 82]. In a report on this lecture, the Kotlin newspaper reported on April 1, 1897: "The experiments that furnished the lecture were successful and aroused great interest in the audience." It is not difficult to conclude from this that by March 1897 A.S. Popov had already gained experience in using the Morse telegraph apparatus to record received signals so much that he could already share it with the audience of his lecture.

Later, speaking in Odessa on September 18, 1897 at a congress of railway signalmen, A.S. Popov demonstrated his receiver in connection with the Morse telegraph apparatus. In the Notes of the Odessa branch of the RTO (1897, issue 7) we read: “An electric apparatus (transmission) was installed in the room occupied by the library of the Technical Society, and in the large hall, behind a thick stone wall, a receiver invented in front of the audience the speaker in 1895. The receiver consists of a small glass tube with iron filings, a galvanic battery and a telegraph apparatus. At the very moment when sparks were generated in the apparatus, signs appeared on the receiving telegraph apparatus. Moreover, the thick walls of the Technical Society did not at all serve as an obstacle ”[1, p. 115].

Finally, the “Postal and Telegraph Journal” in its October issue of 1897 (p. 1044) announced Popov’s speech on October 31 at a meeting of the RTO: “At the end of the message, AS Popov made a number of successful experiments in which under the influence of electric waves and without any wires the bell rang and the telegraph apparatus worked not only directly, but also at the time when obstacles in the form of a grid and a board were placed between the transmitting and receiving devices ... Initially, the Popov device operated at a distance of 40 soot., then at 400 soot ., and now the distance is the composition yaet for several miles. "

This means that the words spoken during the October 19 report at the Electrotechnical Institute: “they couldn’t send telegrams, etc.,” refer only to that specific date, since from March 1897 until the end of October, successful reception of signals on paper tape The Morse telegraph apparatus was carried out repeatedly, which was recorded by a number of documents.

Let us cite the evidence of another source in 1900, which is the Explanatory Catalog of Exhibits Exhibited by the Sixth Division of the Republic of Tatarstan, published in St. Petersburg in Russian and French for the 1900 World Exhibition in Paris. On the question noted above, this book says: “In March 1897, therefore, before the publication of the“ secret ”of Marconi, A.S. Popov at his lecture at the Maritime Assembly in Kronstadt for the first time demonstrated wire-free telegraphy using the Morse apparatus. Telegraphy was carried out within a single (albeit fairly extensive) building, but then the Ministry of the Sea invited A.S.Popov to undertake large-scale experience in order to apply it to the needs of maritime practice. These experiments continue to this day, and the distances at which cabling is performed are increasing, and the instruments are being improved. Last winter, during an accident experienced by the battleship General Admiral Apraksin, telegraphing was carried out according to the system of A. Popov at a distance exceeding 40 versts - between the island of Hogland and the city of Kotka, and in the telegraph system there are no details similar with those introduced by Marconi. But we cannot talk about the details of this system, since this right belongs to the Ministry of the Sea. ”

In conclusion, it remains to say that A.S.Popov remains an indisputable superiority with respect to the combination of the following devices: Branly tube, relay, shaker in the form of a bell hammer and recording device. In addition, A.S. Popov indicated the value of the length and direction of the wire receiving electrical vibrations before others ”[4, p. 67].

In the light of all the above, the conclusion suggests itself that the transmission and reception of one word “Hertz” with its recording on the Morse telegraph apparatus during a public lecture by A. S. Popov in the Russian Physico-Chemical Society on December 18, 1897 is not the first . It is absolutely obvious that this program cannot be equated with a demonstration on March 12 (24), 1896, during which two words were transmitted, in Latin letters, with their writing in chalk on a blackboard and with a limited number of participants. The use of the telegraph apparatus was not confirmed by all participants in the meeting and remains a research question.

Output. Taking into account: a) technical characteristics and tactical data of the equipment of A.S. Popov; b) statements in 1906 by E.L. Korinfsky that the problem of wireless telegraphy was solved by Popov in early 1896; c) recollections of the participants of the RFHO meeting on March 12 (24), 1896, O.D. Khvolson (1906 and 1925), V.V. Skobeltsyna (1925), V.K. Lebedinsky (1926), P.N. Rybkin and V.F. Heinrich Hertz’s electromagnetic waves were first broadcast on the Morse code on March 12 (24), 1896, during a report by A.S. Popov.

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